

REMARKS/ARGUMENTS

The final Office Action of November 26, 2008 and the Advisory Action mailed February 6, 2009 have been carefully reviewed and these remarks are responsive thereto. Claims 23-40 are pending, and allowance of these claims is respectfully requested. Claims 23, 24 and 27 have been amended to clarify the claimed inventions and no new matter has been added to the application.

Interview Summary

Applicants' Representative would like to thank Examiner Chawla for her time and consideration in participating in a short telephone Interview on February 20, 2009 to discuss options for progressing with prosecution of the application. U.S. Patent No. 4,551,342 to Nakel et al. was briefly discussed with respect to the disclosure of malic and/or succinic acid in combination with citric and phosphoric acid in beverages. None of the claims in particular were discussed and no agreement was reached. The Applicants' Representative appreciated having the opportunity to discuss the case with Examiner Chawla.

Rejection under 35 U.S.C. 103(a)

Claims 23-40 were rejected under 35 U.S.C. 103(a) as being unpatentable over Braun et al. (US 4,830,862) in view of combination of Van Ness (US 3,245,798), Lee et al. (US 5,348,756), and Nakel et al. (US 4,551,342). The Applicants respectfully disagree and traverse the rejection. For example, none of the cited art, either alone or in combination, suggests a method comprising "including in a lemon/lime flavored beverage an acidulant system consisting of (i) citric acid and (ii) adipic acid," "increasing the pH of the lemon/lime flavored beverage by up to about 0.7 pH units until the beverage has a pH between about 3.2 and about 3.8 at the time of manufacture by including in the lemon/lime flavored beverage a buffer salt system consisting of a citrate salt and a phosphate salt," and wherein either "the ratio by weight of said adipic acid : said citric acid is 1 : 15 to 1 : 3," as recited in independent claim 23, or "the ratio by weight of

said adipic acid : said phosphoric acid : said citric acid is 3.0-4.0 : 1.4-2.0 : 1.0,” as recited in independent claim 24.

Independent claims 23 and 24 have been amended to clarify the claimed inventions. For instance, amended independent 23 has been amended to specify that the acidulant system comprises “citric acid in an amount from about 0.18 to about 0.24 % by weight of the finished lemon/lime flavored beverage.” This amendment is supported at least by paragraph [0020] of the specification as originally filed. Claim 27, dependent from either claim 23 or claim 24, recited this amount of citric acid and thus has been amended to no longer depend from claim 23.

Claim 23 has also been amended to recite, in part, “wherein for at least four weeks following manufacture the beverage is more tart and has a stronger lemon/lime taste than a beverage having a pH of at least about 3.0 and without said ratio.” Similarly, amended claim 24 recites, in part, “wherein the ratio by weight of said adipic acid : said phosphoric acid : said citric acid is 3.0-4.0 : 1.4-2.0 : 1.0, and wherein for up to seven months following manufacture the beverage is more tart and has a stronger lemon/lime taste than a beverage having a pH of at least about 3.0 and without said ratio.” These amendments to claims 23 and 24 are supported at least by Example 2, Comparative Example 2, and paragraph [0038] of the application as originally filed, thus no new matter has been added to the application.

The Office Action acknowledges on page 7 that the prior art does not expressly teach the exact acid ratios. However, the Office Action states on pages 6-7 that “altering the relative amounts of edible acids in a beverage composition was known to a skilled artisan at the time of the invention.” The Office Action states that “[t]herefore, it would have been a matter of routine optimization experimentation to one of ordinary skill at the time of the invention to modify beverage composition as taught by Braun and include organic acids such as adipic acid in relative amounts in order to keep the total acidity of the beverage in the desired range in order to make a beverage that has desirable tartness and pH and that remains stable upon storage, as taught by Nakel.” *Id.* The Office Action also states on page 5 that “Lee teaches that by modifying the ratio of food acids with proper combination and ratio of buffer salts it is possible to raise the pH of the without lowering the desirable sour taste.”

The Applicants respectfully disagree. There is no guidance for one of skill in the art, from the disclosures of the combined references, regarding how to choose among the countless potential combinations of acids and salts to provide a pH 3.2-3.8 lemon/lime beverage that is more tart and has a stronger lemon/lime taste than a beverage having a pH of at least about 3.0 and without the particular adipic acid to citric acid ratio, for at least four weeks following manufacture. Indeed, combining various known beverage components does not provide predictable results as to taste and other organoleptic properties. This is illustrated by the disclosure of Nakel. The Office Action notes that Nakel provides calculations to come up with an appropriate amount of cation and acid components for a beverage. However, the calculations for the acids disclosed by Nakel are relevant *only for beverages containing the specific taste tested components*: “The ternary diagram for the cation and acid components were developed by evaluating a number of attributes of liquid beverages containing different mixtures of these key cations and acids.” (Col. 7, 37-40) Further, “a panel of 15 expert tasters evaluated several sets of beverage samples containing 10 selected mixtures of cations (acid component held constant) and 10 selected mixtures of acids (cation component held constant).” (Col. 7, lines 51-55) Consequently, the equations were determined completely experimentally for a specific combination of ingredients and there is no guidance for one of skill in the art regarding extrapolating the disclosure or predicting how to successfully prepare other, different beverages with different components not disclosed in Nakel.

Moreover, nowhere in the disclosure of Nakel is it suggested that other acids could be used *in place of* phosphoric, malic/citric acid, citric/phosphoric acid, or a mixture of citric, malic and phosphoric acid, aside from noting specifically that succinic acid may partially or wholly be substituted for malic acid. Instead, Nakel states that other edible acids can *also* be included in the acid component. (See col. 7, lines 3-13) Accordingly, there would have been no reason for one of skill in the art to employ adipic acid *instead of* malic/succinic acid with a reasonable expectation of success with respect to the taste of the composition, using the calculations of Nakel.

In the Interview of February 20, 2009, Examiner Chawla asked what is different about adipic acid as opposed to other organic acids disclosed in the application specification that also have smaller dissociation constants than citric acid (i.e., succinic acid and glutaric acid). It appears that this question relates to whether or not there was a motivation for substituting adipic acid for the malic/succinic acids of Nakel, based on the knowledge that these acids each have dissociation constants lower than that of citric acid. However, one of ordinary skill in the art at the time the invention was made would not have been motivated to make a substitution of adipic acid for malic or succinic acid based on their dissociation constants because it was *only in the Applicants' disclosure* that it was recognized that an acid with a lower dissociation constant than citric acid could provide tartness for at least four weeks, even with an increase in pH. The only suggestion for the particular use of adipic acid due to its dissociation constant comes from the Applicants' own disclosure, therefore specific differences between the organic acids having dissociation constants lower than citric acid are not important to the patentability of the instant claims.

Furthermore, Nakel teaches away from the invention of amended claim 23 because the relative amounts of the acids are not even within the desired range taught by Nakel. The equation disclosed by Nakel for determining amounts of acid component in beverages is as follows: $(8.7 \times \text{cit}) + (8.9 \times \text{mal}) + (11.4 \times \text{phos}) + (5.5 \times \text{cit} \times \text{mal}) - (0.6 \times \text{cit} \times \text{phos}) + (5.0 \times \text{mal} \times \text{phos}) + (30.1 \times \text{cit} \times \text{phos}) = A$, where A is between 9.6-12.1. The beverage recited in amended claim 23 contains adipic acid and citric acid in a weight ratio of 1:15 to 1:3, with citric acid in an amount between 0.18 and 0.24 wt. %. Accordingly, the adipic acid can be calculated as present in an amount between 0.012 and 0.08 wt. % of the finished beverage. Inserting the minimum and maximum citric acid and adipic acid amounts into the Nakel formula results in A values of 1.68 and 2.91, respectively. [Minimum acid concentrations: $(8.7 \times 0.18) + (8.9 \times 0.012) + (11.4 \times 0) + (5.5 \times 0.18 \times 0.012) - (0.6 \times 0.18 \times 0) + (5.0 \times 0.012 \times 0) + (30.1 \times 0.18 \times 0) = 1.68$. Maximum acid concentrations: $(8.7 \times 0.24) + (8.9 \times 0.08) + (11.4 \times 0) + (5.5 \times 0.24 \times 0.08) - (0.6 \times 0.24 \times 0) + (5.0 \times 0.08 \times 0) + (30.1 \times 0.24 \times 0) = 2.91$] These A values are between about **3.3 and 7.2 times lower** than the A values of 9.6-12.1 taught by Nakel to provide a

beverage having desired organoleptic attributes. Thus, the teachings of Nakel are not necessarily applicable to other beverages and the method of the present invention yields more than a predictable result.

There is no simply suggestion from the disclosures of Braun, Van Ness, Lee and Nakel to select the claimed weight ratios of the specific acids and buffer salts. There are innumerable possible combinations of types and amounts of edible acids and buffering salts; the disclosure of several examples of combinations in the cited art does not render obvious *every other* combination. For example, the only cited art to disclose combining adipic and citric acids is Lee, which teaches a very different weight ratio of the two acids than is recited in the instant claims. In particular, Lee teaches that a strawberry flavored gelatin dessert mix or gel "can be reformulated to increase the pH for 0.2 units or more without lowering the sour taste by employing an adipic acid to fumaric acid and/or citric acid ratio of from 15-21 : 1," (Col. 2, lines 37-40). The instant claims related to a lemon/lime beverage, in contrast, recite an adipic acid to citric acid weight ratio of from 1 : 15 to 1 : 3 (claim 23) and 3 : 1 to 4 : 1 (claim 24). These ranges are substantially different from the weight ratio ranges taught by Lee to provide a desirable sour taste in combination with buffering salts, and there is no suggestion within the disclosure of Lee that selecting any alternate ratios would provide a tart taste and a stronger lemon/lime taste in a beverage for at least four weeks.

Consequently, while the cited art may teach that adipic acid can be used in a beverage, there is no teaching in any of the cited documents that a specific ratio by weight of adipic acid to citric acid can solve the problem of tartness of a lemon/lime flavored beverage being unacceptably compromised when the pH of the lemon/lime flavored beverage is raised to make the flavor of the beverage stable for a longer period of time, i.e., at least four weeks. The prior art of Braun, Van Ness, Lee and Nakel, alone or in combination, fail to provide any guidance whatsoever as to which acid combination and ratio by weight of acids within such an acid combination could possibly solve the tartness problem when the pH of a lemon/lime flavored beverage is increased by up to about 0.7 pH units until the beverage has a pH between 3.2 and 3.8 at the time of manufacture.

Thus, one of ordinary skill in the art would not have been motivated by a combination of Braun, Van Ness, Nakel, and Lee, to practice the methods of amended independent claims 23 or 24. Even if one of ordinary skill in the art was motivated to combine Braun, Van Ness, Nakel, and Lee, the proposed combination does not result in the claimed inventions. For example, none of the cited art, either alone or in combination, teaches a method including “increasing the pH of the lemon/lime flavored beverage by up to about 0.7 pH units until the beverage has a pH between about 3.2 and about 3.8 at the time of manufacture by including in the lemon/lime flavored beverage a buffer salt system consisting of a citrate salt and a phosphate salt, wherein the ratio by weight of said adipic acid : said citric acid is 1 : 15 to 1 : 3, and wherein for at least four weeks following manufacture the beverage is more tart and has a stronger lemon/lime taste than a beverage having a pH of at least about 3.0 and without said ratio,” as claimed in claim 23, as amended.

Similarly, none of the cited art teaches a method including “increasing the pH of the lemon/lime flavored beverage by up to about 0.7 pH units until the beverage has a pH between about 3.2 and about 3.8 at the time of manufacture by including in the lemon/lime flavored beverage a buffer salt system consisting of a citrate salt and a phosphate salt, wherein the ratio by weight of said adipic acid : said phosphoric acid : said citric acid is 3.0-4.0 : 1.4-2.0 : 1.0, and wherein for up to seven months following manufacture the beverage is more tart and has a stronger lemon/lime taste than a beverage having a pH of at least about 3.0 and without said ratio,” as recited in amended claim 24.

In view of the foregoing, it is respectfully submitted that amended independent claims 23 and 24 are patentable over the prior art. The dependent claims are patentable for at least the same reasons that independent claims 23 and 24 are patentable, and for the additional features recited therein.

Conclusion

In view of the foregoing, it is respectfully submitted that pending claims 23-40 are in condition for allowance. The Examiner is invited to contact the undersigned at the telephone

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Reply to Office Action of November 26, 2008 and Advisory Action of February 6, 2009

number provided below, should it be deemed necessary to facilitate prosecution of the application.

Respectfully submitted,
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